

Fig. 1

09272948.061101

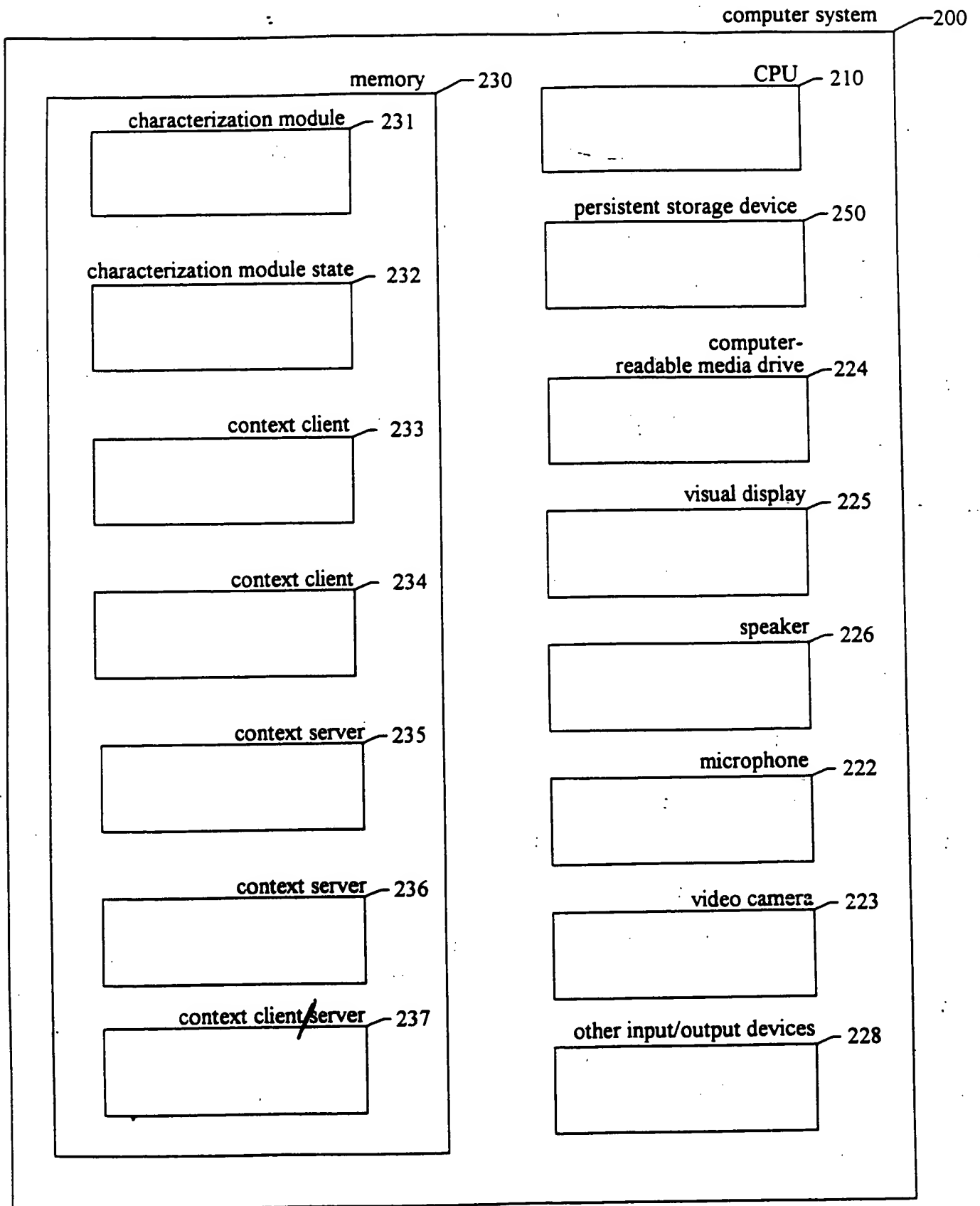


Fig. 2

310 320

CONTEXT
SERVER
(GPS)

CONTEXT
SERVER
(CIPS)

user
location
attribute

user
location
attribute

user
elevation
attribute

user
in-region
attribute

CHARACTERIZATION MODULE

user
location
attribute

user
in-region
attribute

user
elevation
attribute

user
location
attribute

CONTEXT
CLIENT
(distance-
from-home)

CONTEXT
CLIENT
(location-
map)

CONTEXT
CLIENT/
SERVER

340

341

351

352

332

311

321

322

331

300

333

FIG. 3

600

context client table	
context client name	message handler
location map	(reference)
distance from home	(reference)
region analysis	(reference)

601 ✓
602 ✓
603 ✓

612

611

FIG 6

700

attribute instance table					
attribute name	context server name	value	uncertainty	timestamp	units
user.location	gps	47° 38.73' N, 122° 18.43' W	0° 09'	13:11:04.023 2/22/2000	degrees/minutes
user.location	ips	47° 38.745' N, 122° 18.424' W	0° 021'	13:11:01.118 2/22/2000	degrees/minutes
user.elevation	ips	22	.5	13:11:01.118 2/22/2000	meters
user.in_region	location_region_analysis	none	none	none	none

701 ✓
702 ✓
703 ✓
704 ✓

711 L 712 L 713 L 714 L 715 L 716 L 717

FIG 7

400

context server table

context server name	version	installation date	filename	request handler (reference)
gps	1	2/10/2000	gps.exe	(reference)
ips	1	2/21/2000	ips.exe	(reference)
location_region_analysis	1	2/10/2000	l r a.exe	(reference)

401
402
403

412

413

414

415

FIG 4

500

attribute instance table

attribute name	context server name	value	uncertainty	timestamp	units	number of context clients consuming
user.location	gps	47° 38.73' N, 122° 18.43' W	0° 09'	13:11:04.023 2/22/2000	degrees/minutes	2
user.location	ips	47° 38.745' N, 122° 18.424' W	0° 021'	13:11:01.118 2/22/2000	degrees/minutes	2
user.elevation	ips	22	.5	13:11:01.118 2/22/2000	meters	1
user.in_region	location_region_analysis	none	none	none	none	0

501
502
503
504

511

512

513

514

515

516

517

FIG 5

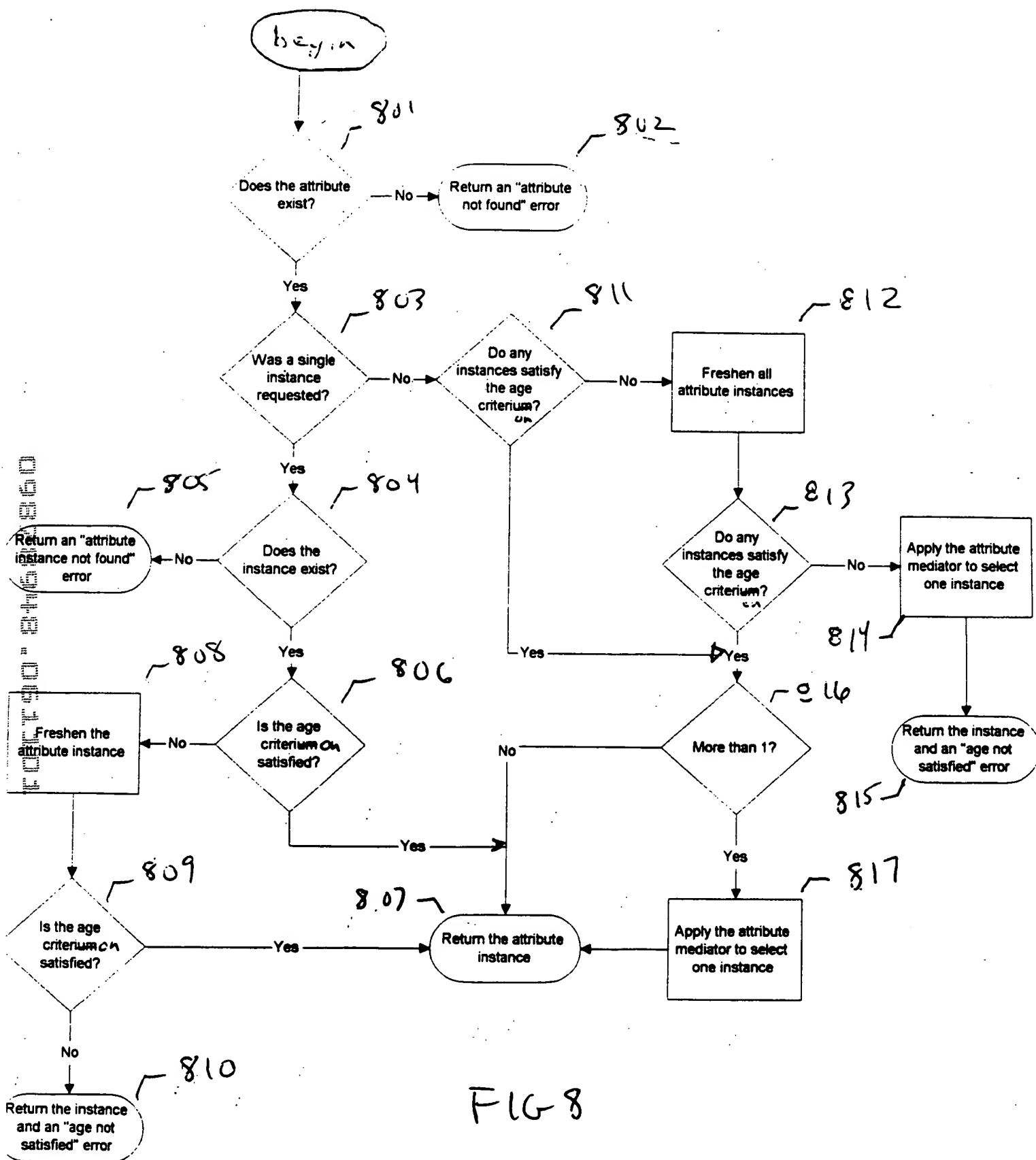


FIG 8

900

attribute instance table

attribute name	context server name	value	uncertainty	timestamp	units	number of context clients consuming
user location	gps	47° 38.73' N, 122° 18.43' W	0° .09'	13:11:04.023 2/22/2000	degrees/minutes	2
user location	ips	47° 38.745' N, 122° 18.424' W	0° .021'	13:11:01.118 2/22/2000	degrees/minutes	2
user elevation	ips	22.25	.5	13:11:06.565 2/22/2000	meters	1
user in region	region analysis	none	none	none	none	1

901

902

903

904

917

916

915

914

913

912

911

FIG 9

1000

condition table

condition name	context client name	first logical parameter	second logical parameter	comparison value	logical operator
in region true	region analysis	user in region	none	TRUE	=

1001

1011

1012

1013

1014

1015

1016

FIG 10

1100

condition monitor table

condition monitor name	context client name	condition name	behavior	frequency	condition last evaluated	trigger handler reference	stopped
region_boundaries_crossed	region_analysis_s	in_region_true	TRUE or FALSE	30	13:11:29.101 2/22/2000	(reference)	no

1101

1118

FIG 11

1200

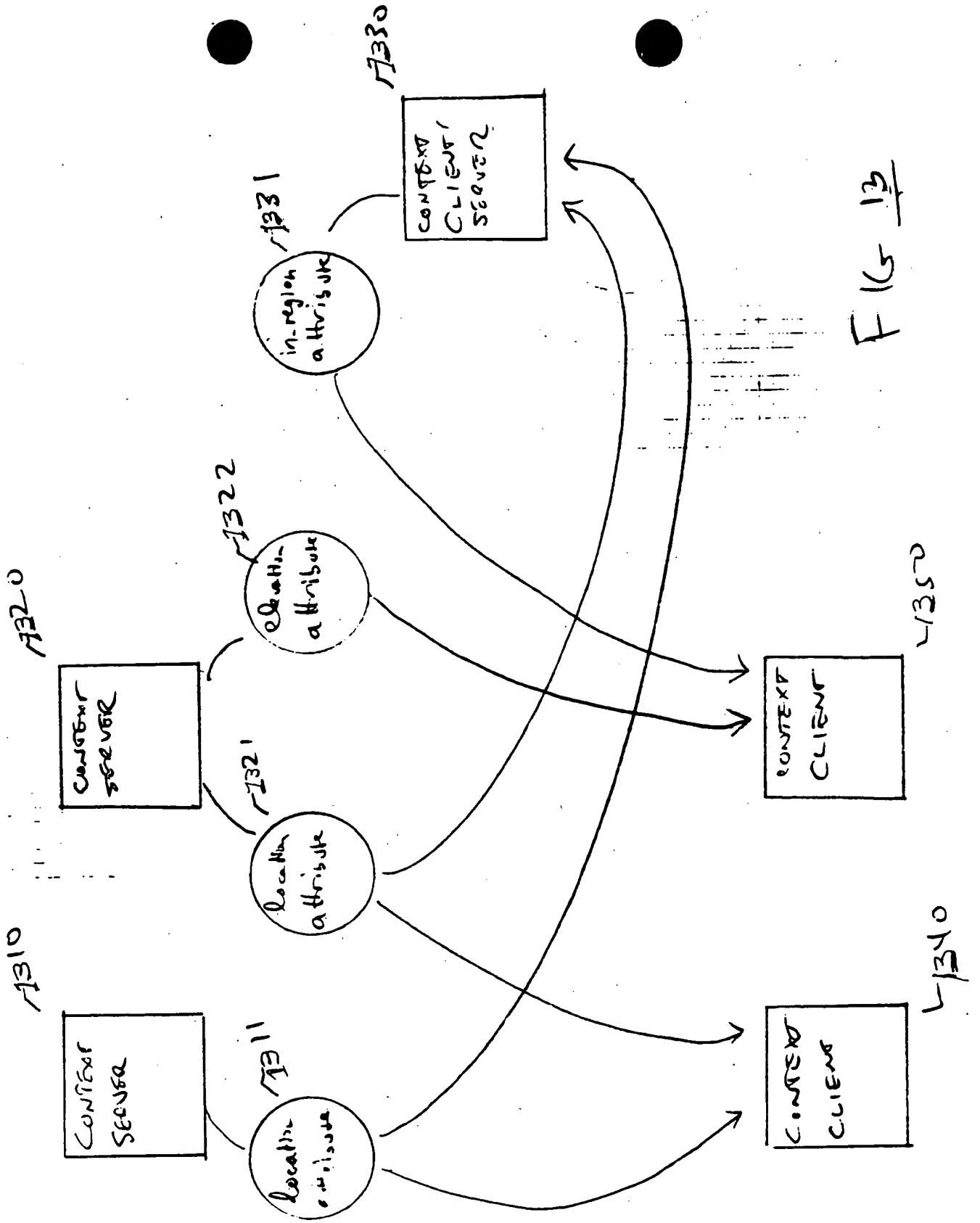
condition monitor table

condition monitor name	context client name	condition name	behavior	frequency	condition last evaluated	trigger handler reference	stopped
region_boundaries_crossed	region_analysis_s	in_region_true	TRUE or FALSE	30	13:11:59.101 2/22/2000	(reference)	yes

1201

1218

FIG 12



attribute request table

attribute name	context client name
user.location	distance_from_home
user.in_region	location_map
user.location [gps]	location_region_analysis
user.elevation	location_map

1411

Figure 14

1412

09878948-061101

User.

Desired_privacy_level
 Interruptibility
 Speed
 Direction
 Acceleration
 Availability.
 Cognitive_availability
 Tactile_availability
 Manual_availability
 Visual_availability
 Oral_availability
 Auditory_availability
 Proximity.<Item or place name>
 Mood.

Happiness
 Sadness
 Anger
 Frustration
 Confusion

Activity.

Driving
 Eating
 Running
 Sleeping
 Talking
 Typing
 Walking

Location.

Place_name
 Latitude
 Longitude
 Altitude
 Room
 Floor
 Building
 Address
 Street
 City
 County
 State
 Country
 Postal_Code

Destination. (same as User.Location.)

Physiology.

Pulse
 Body_temperature
 Blood_pressure
 Respiration

Person.<name or ID>. (same as User.)

Platform.**UI.**

Oral_input_device_availability
 Manual_input_device_availability
 Tactile_output_device_availability
 Visual_output_device_availability
 Auditory_output_device_availability

Platform. (continued)**CPU.**

Load
 Speed

Memory.

Total_capacity
 Used

Storage.

Total_capacity
 Used

Connectivity.

Connection_status
 Connection_speed
 Connection_type/device
 Connection_activity

Power.

Power_source
 Power_level

Environment.**People.**

Nearest
 Number_present
 Number_close

Local.

Time
 Date
 Temperature
 Pressure
 Wind_speed
 Wind_direction
 Absolute_humidity
 High_forecast_temperature
 Low_forecast_temperature
 People_present
 Ambient_noise_level
 Ambient_light_level
 Days.<previous or future>.
 High_temperature
 Low_temperature
 Precipitation_type
 Precipitation_amount

Place.<place name>. (same as Environment.Local)

Application.**Mail.**

Available
 New_messages_waiting
 Messages_waiting_to_be_sent

Phone.

Available
 In_use
 On/off
 Notification_mechanism
 Call_incoming
 Caller_ID

Sound_recorder.

Available
 Recording

Fig. 15

09878948-061101

1) User Setting

a) Mental Context

- i) Meaning
- ii) Cognition
 - (1) Divided User Attention
 - (2) Task Switching
 - (3) Background Awareness

iii) Solitude

iv) Privacy

- (1) Desired Privacy
- (2) Perceived Privacy

v) Social Context

vi) Affect

b) Physical Situation

i) Body

- (1) Biometrics
- (2) Posture
- (3) Motion
- (4) Physical Encumbrment

(a) Senses

- (i) Eyes
- (ii) Ears
- (iii) Tactile
- (iv) Hands
- (v) Nose
- (vi) Tongue

(b) Workload demands/effects

(c) Interaction with computer devices

(d) Interaction with people

(e) Physical Health

ii) Environment

(1) Time/Space

(2) Objects

(3) Persons

(a) Audience/Privacy Availability

(i) Scope of Disclosure

(ii) Hardware affinity for privacy

(iii) Privacy Indicator for User

(iv) Privacy Indicator for Public

(v) Watching Indicator

(vi) Being Observed Indicator

(4) Ambient Interference

(a) Visual

(b) Audio

(c) Tactile

2) Computer

a) Power

b) Configuration

i) User Input Systems

(1) Hand/Haptic

(a) Keyboard/Keystrokes

(2) Voice/Audio

(3) Eye Tracking

(4) Cursors

(a) Axis

(b) Resolution

(i) Selection

(ii) Invocation

(c) Accelerators

ii) Output Systems

(1) Visual

(a) Resolution

(2) Audio

(a) Public/Private

(3) Haptic

iii) External Resources

(1) I/O devices

(2) Connectivity

c) Data

i) Quantity/State

ii) Urgency/Importance

(1) Use of Prominence

iii) Modality

iv) Sensitivity/Purpose

(1) Privacy Issues

(2) Use of Association

(3) Use of Safety

v) Source/Ownership

(1) Types

(a) User generated

(b) Other computers or people

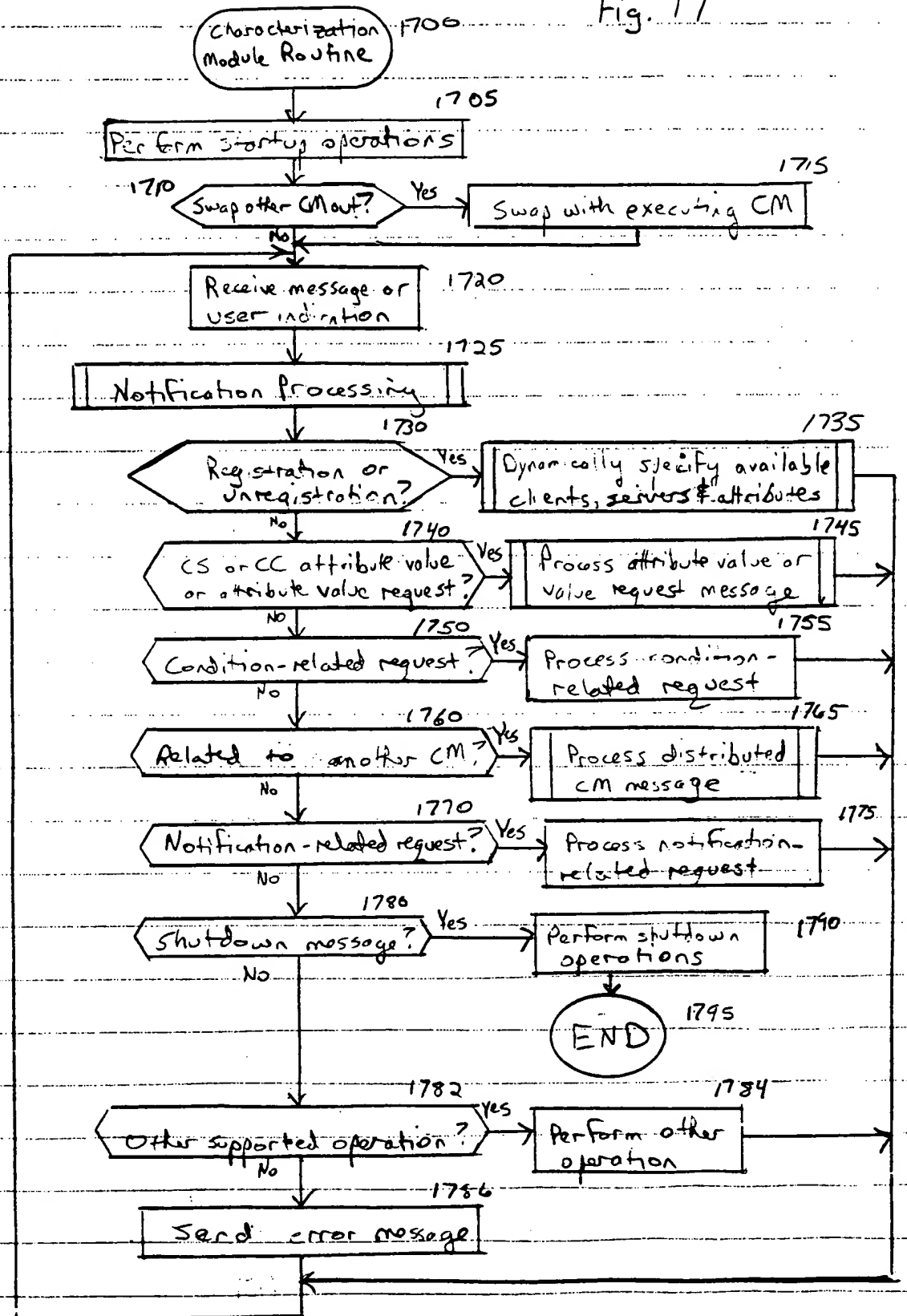
(c) Sensor

(d) PC State

(2) Use of Association

Fig. 16

Fig. 17



Notification
Processing
Subroutine

1725

Fig. 18

Receive indication of received
message or user indication

1805

Compare received message or
user indication to the stored
active notification requests

1810

Retrieve additional information if
needed to determine if any stored
active notification requests
are satisfied

1815

Satisfied notification requests?

1820

Yes

Select next request

1825

Send notification to supplier of the request
that it was satisfied

1830

Remove notification request?

1835

Yes

Remove
request

1840

No

Deactivate notification request?

1845

Yes

Deactivate
request

1850

No

More?

Yes

1895

RETURN

09876543210

Fig. 19

Dynamically Specify Available
Clients, Servers, & Attributes
Subroutine 1735

Receive a registration or
unregistration message 1905

Need security approval? 1910

Determine if security
is satisfied 1915

satisfied? 1920

Send error
message 1925

Related to ? 1930

client

server

attribute(s)

Register? 1940

Register new
client, if
possible 1941

Error? 1942

Send error
message 1944

Attributes
included to
register? 1946

Unregister
client 1950

Unregister? 1948

Any currently
registered attributes
for the client? 1952

Unregister? 1952

Unregister each
attribute 1954

RETURN 1995

Register? 1940

Select next
attribute 1982

Attribute exists? 1984

Register new
attribute
instance 1986

Register new
attribute 1988

More? 1990

Register? 1960

Register new
server, if
possible 1962

Attributes
included
to register? 1966

Error? 1962

Send error
message 1964

Unregister? 1968

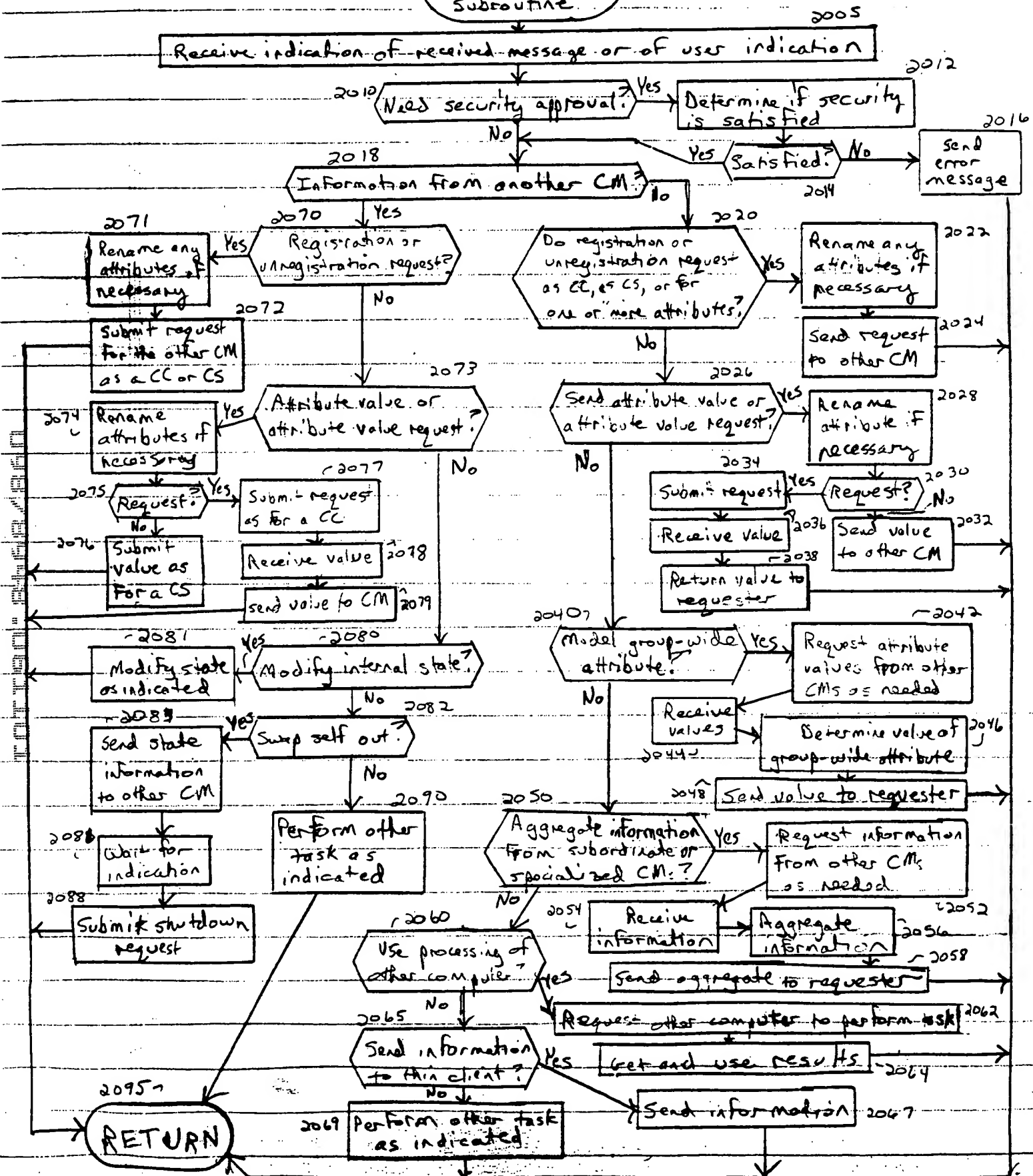
Unregister
Server 1970

Any currently
registered attributes
for the server? 1972

Process Distributed
CM Message
Subroutine

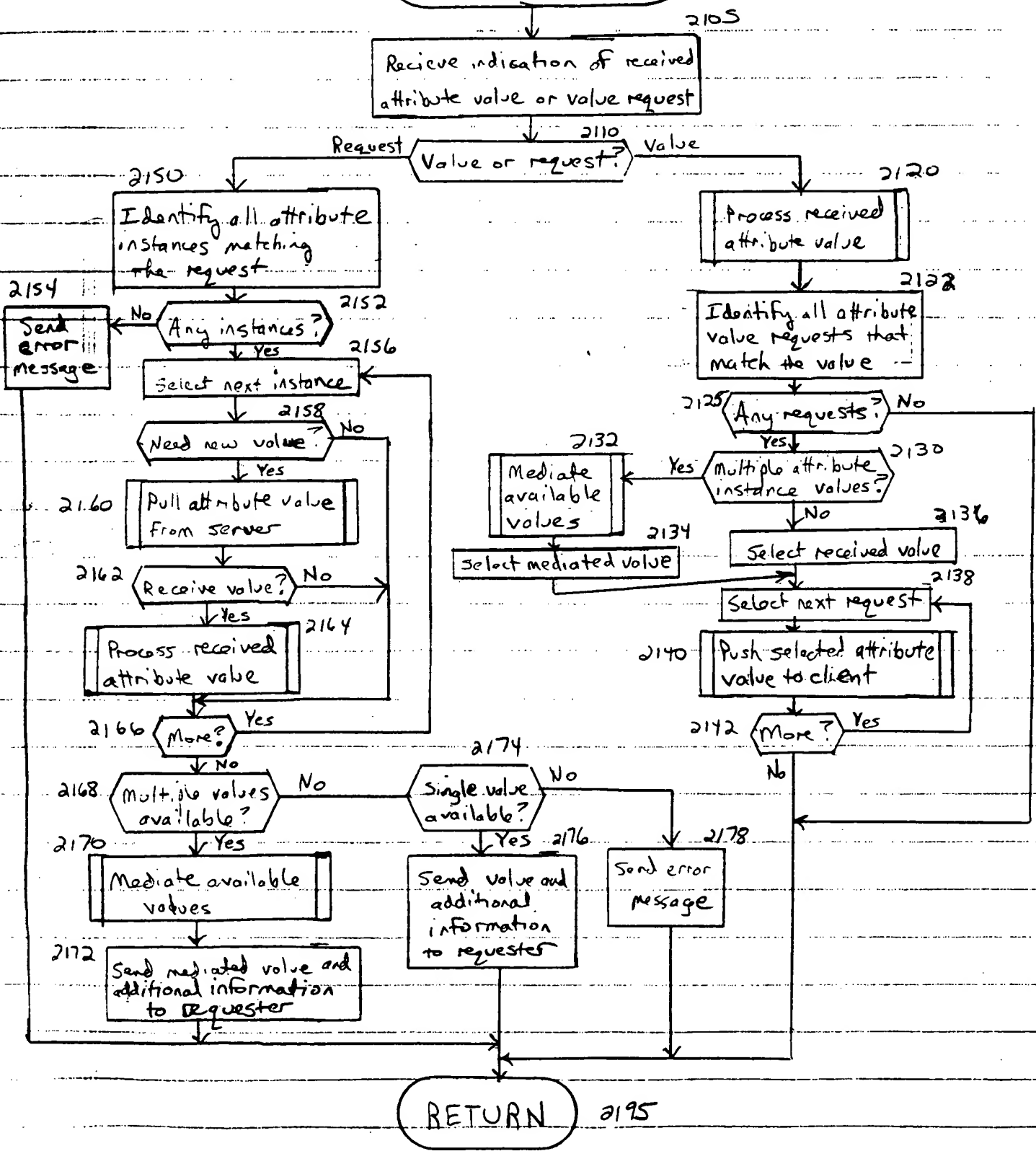
1765

Fig. 20

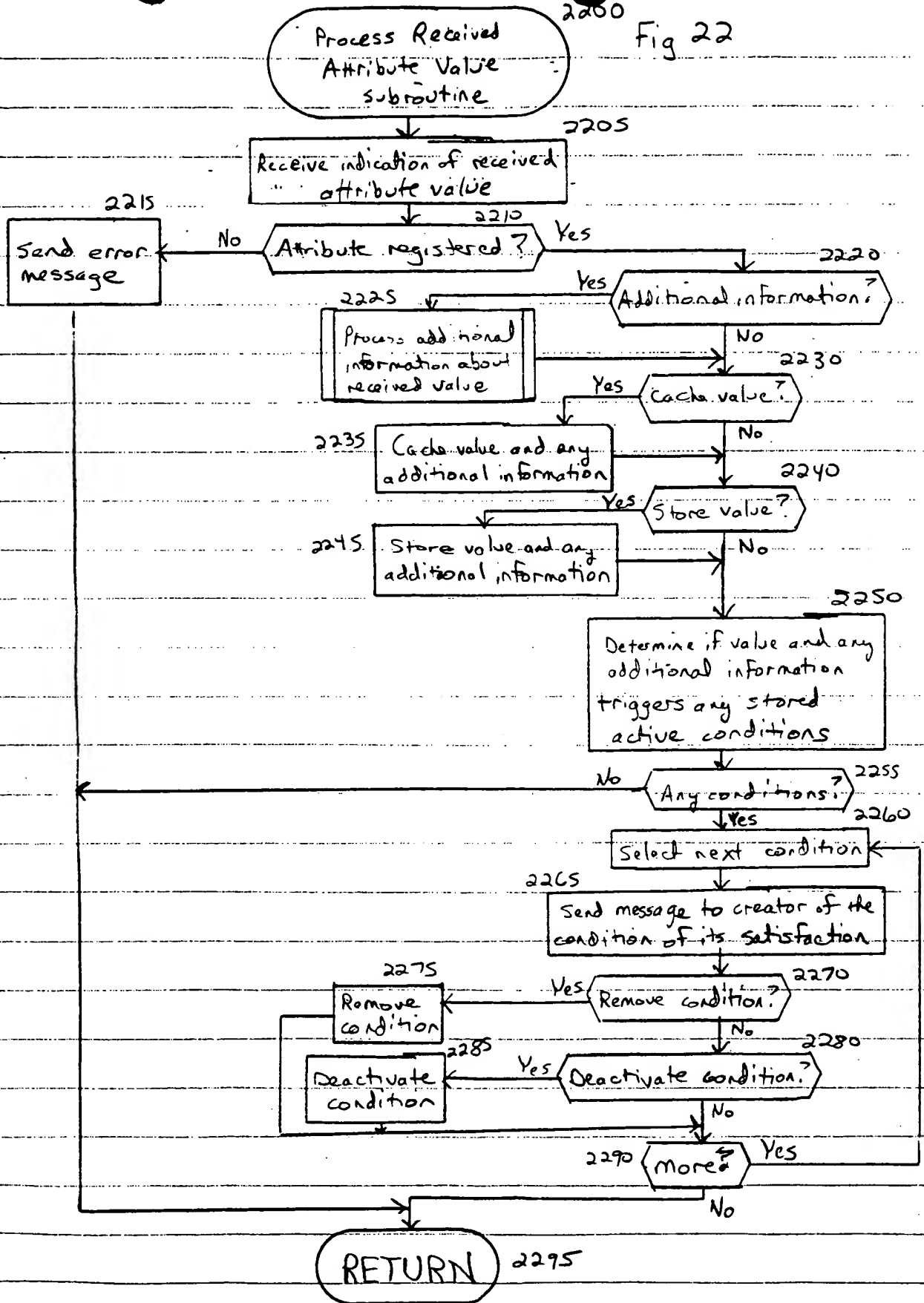


1745 Process Attribute Value or Value Request Message subroutine

Fig. 21

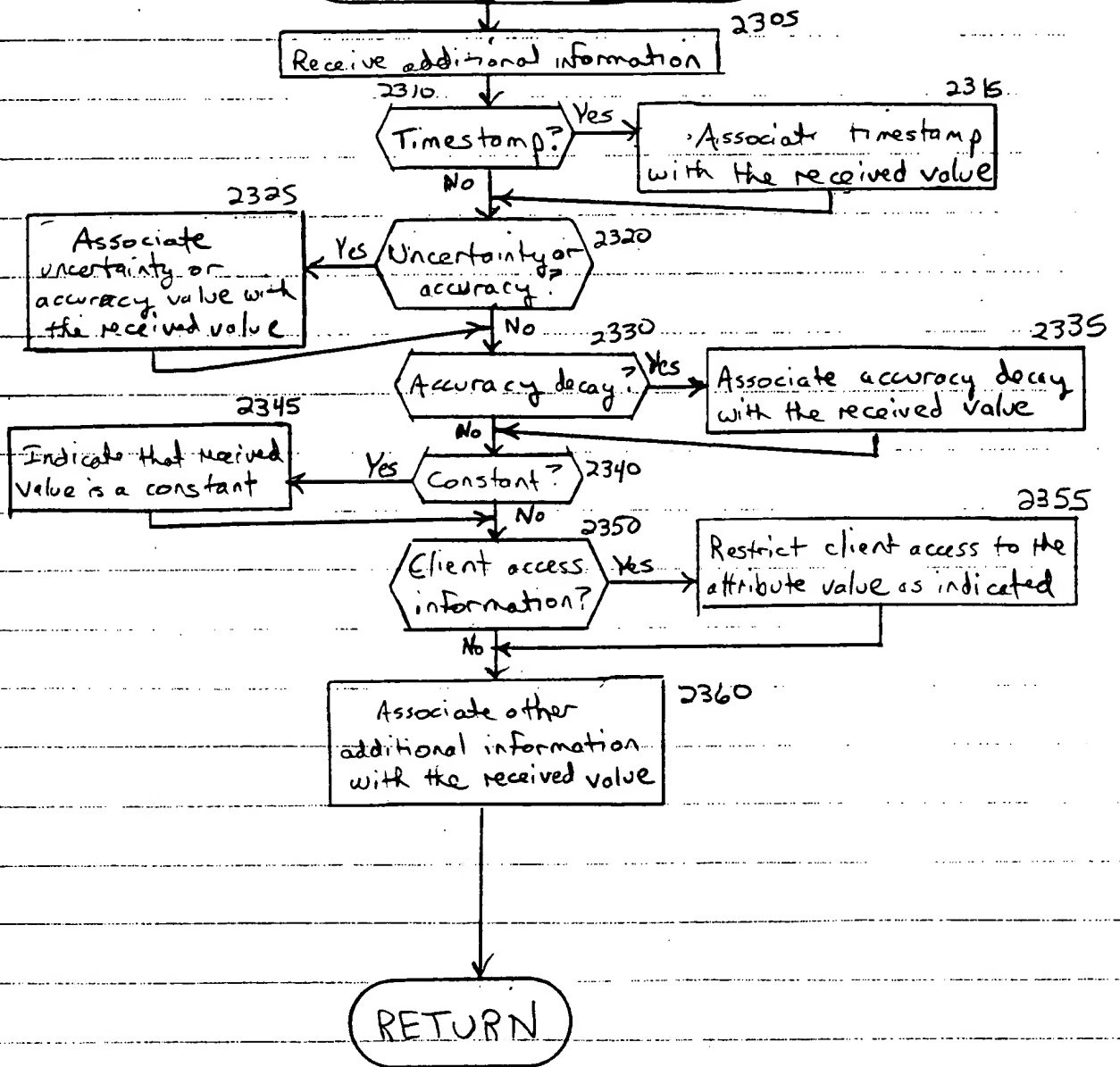


2200 Fig 22



2225
Process Additional Information
About Received Value
Subroutine

Fig. 23



09876543210

Fig. 24

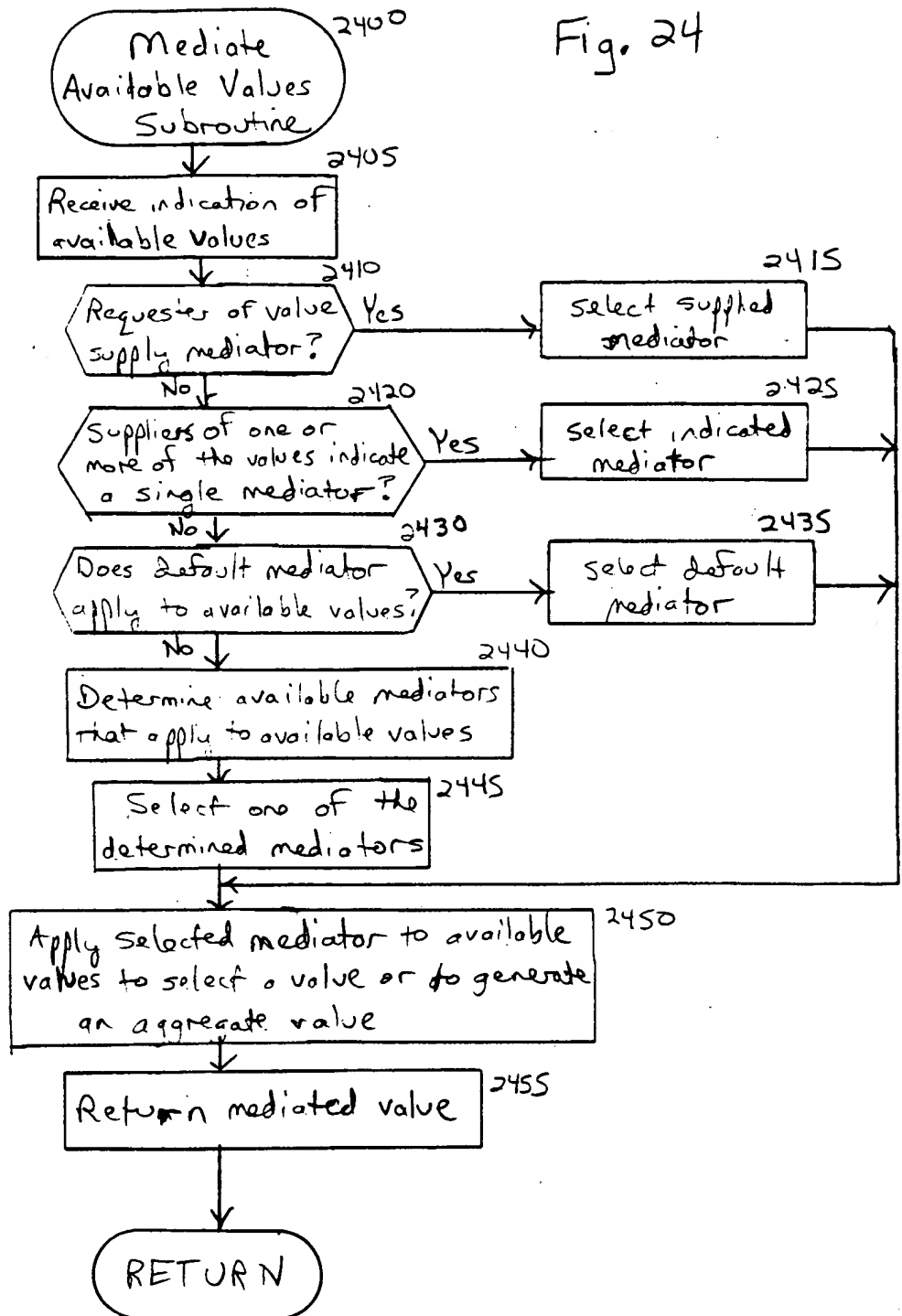
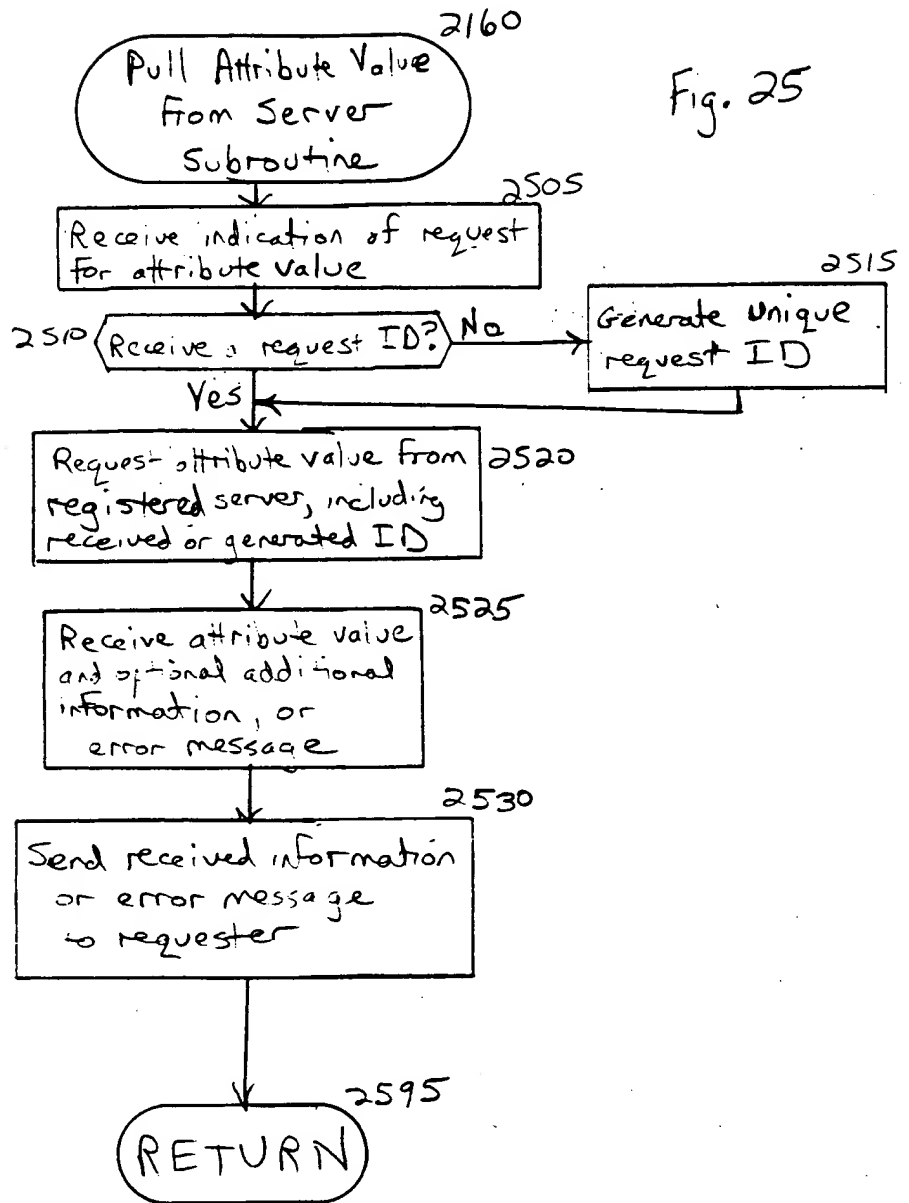
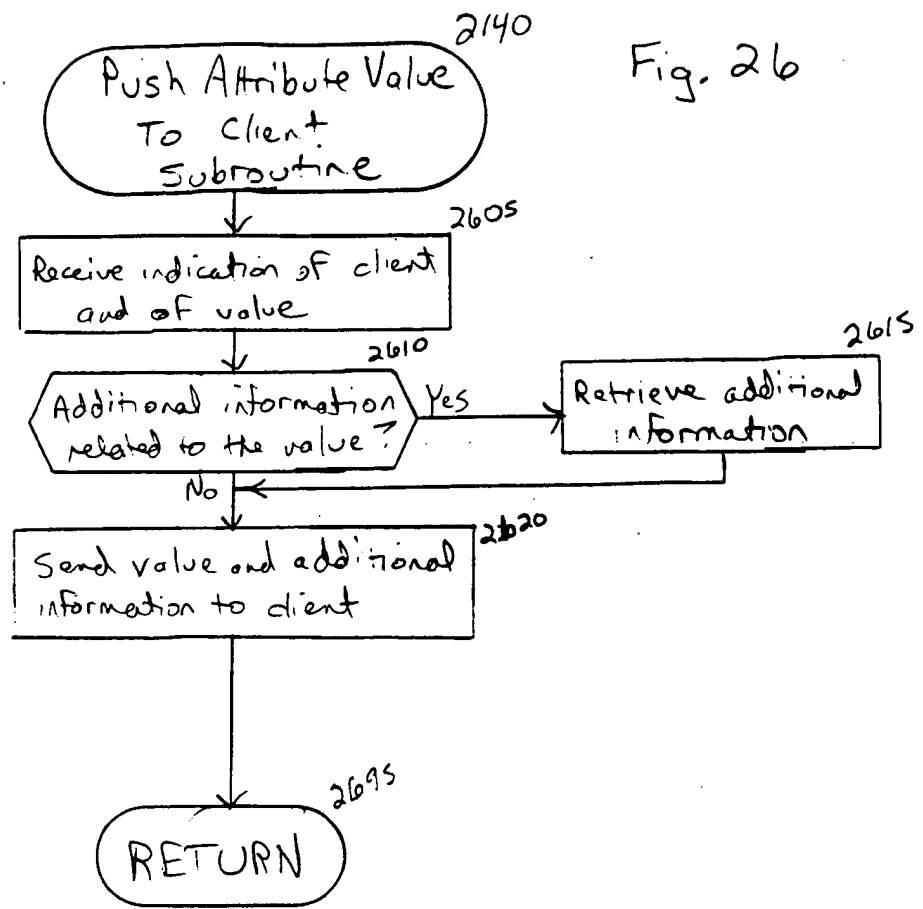


Fig. 25

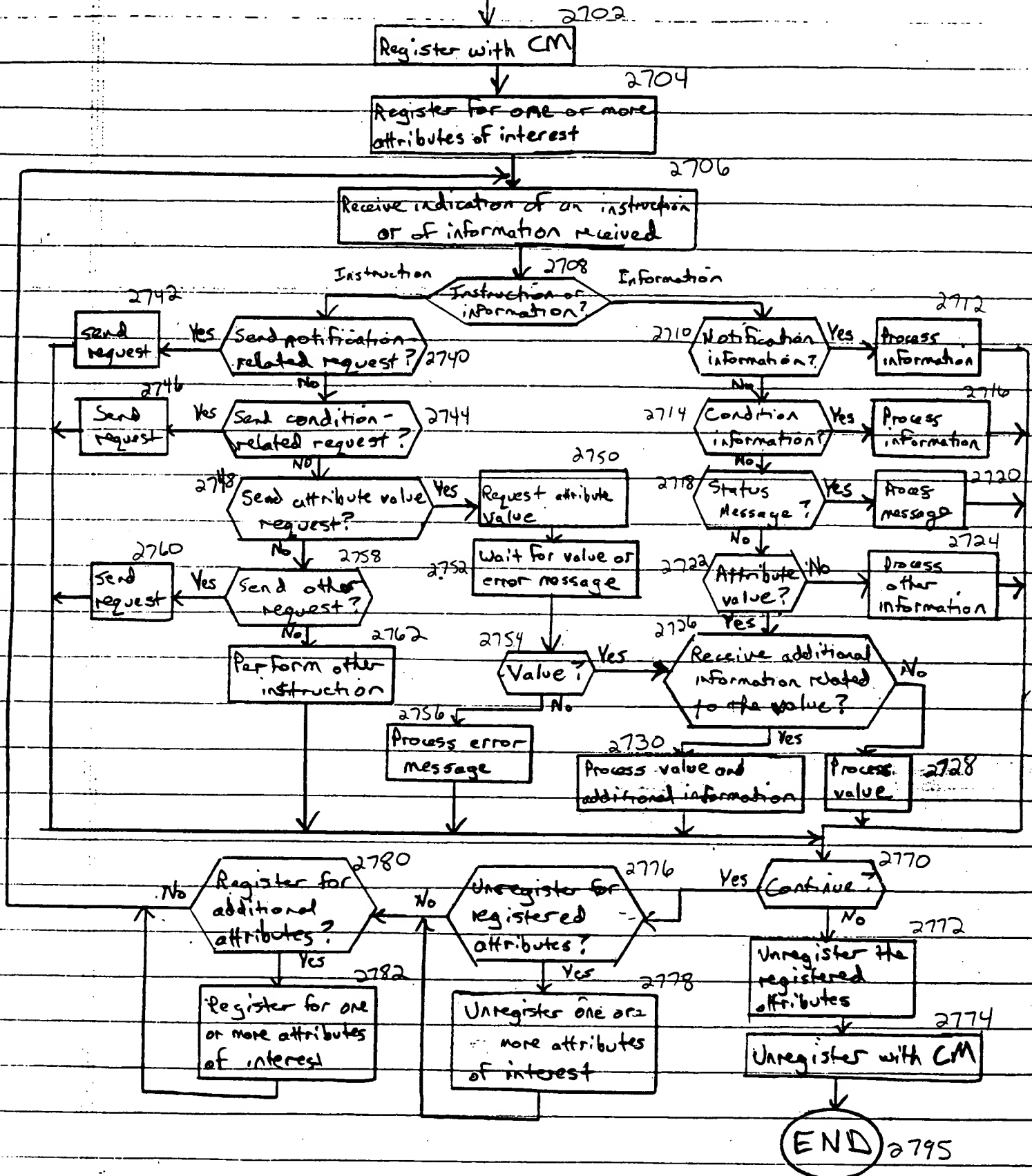


09878948.061101



Context Client Routine 2700

Fig. 27



Context Server Routine 2800

Fig. 28

